

Sailing Seeds: An Experiment in Wind Dispersal

Abstract: Many plants rely on wind to carry their fruits or seeds. In this activity, students explore the mechanism of wind dispersal by creating their own model fruit and evaluating the relationship between the fruit structure and its dispersal ability.

Objectives:

At the end of this exercise, you will be able to:

- Identify different types of fruit and seed dispersal
- Design fruits/seeds so that they will disperse effectively in the wind
- Measure the distance the fruit/seed travels and estimate the time aloft
- Summarize their data in graphical format and analyze their results.
- Determine if there is a correlation between the distance a fruit or seed travels and the amount of time aloft

Background:

Dispersal of seeds is important for the continued survival of a plant species. If plants grow too closely together, they compete for light, water, and soil nutrients; therefore, seed dispersal is a way to distribute offspring. In flowering plants like apple trees, one or more seeds are housed within a fruit which is the portion of the apple that we eat. Sweet fruit like apples are eaten by animals that disperse the undigested seeds. In contrast, some plants have fruit that remain on the plant and disperse only the seeds. In either case, plants have evolved different dispersal mechanisms. Some fruits can be carried by water, like the coconut. Burdock fruits have hooks that attach to and are dispersed by animals. Dandelion fruits are suspended from feathery "parachutes" that are carried on the wind. The fruit of maple and ash trees have wings that let them float on air. In this activity you will learn how fruit or seed size and shape influence their ability to disperse by wind. You will design your own fruit or seed and measure two important qualities that enhance the ability of it to disperse in the wind: distance travelled and time aloft.

Materials:

- fruit and/or seed examples from sunflowers, dandelions, maple trees, coconuts, apples, peas, nuts, etc. (you may choose many different types or the same for each student).
- supplies to construct artificial "fruit" or "seeds" (paper, tape, scissors, glue, pipe cleaners, etc...)
- window or large fan
- meter stick or tape measure
- stop watch
- marker

Procedure:

Examine different types of fruits and seeds (or a group of fruits/seeds with similar methods of dispersal). Make any notes regarding the design, overall appearance, structures of the seeds or fruits.

Obtain one sunflower fruit (commonly called "sunflower seeds") and supplies to construct a wind dispersal mechanism for the fruit. You will place the completed "fruit" in front of the fan and measuring the distance it disperses. You are to determine which design travels the furthest. In addition, you should measure the maximum time the "fruit" remains in the air--the maximum time aloft.

After you have created your "fruit", use the class data to evaluate dispersal characteristics. Set the fan up on a desk blowing horizontally across the room. Establish a standard drop site above the fan and set a tape measure along the floor beneath the fan. Each "fruit" should be dropped five times and the average used in the results.

For the second part of the experiment, drop the "fruit" from a standard height (2 meters) while measuring time spent aloft with a stopwatch. Repeat so that each fruit design has five trials. Calculate the average of the five trials and record.

After all the data has been collected, you should graph the distance traveled and the time aloft. Use all of the class data. Determine if a correlation exists between the maximum time aloft and the distance traveled from their graphs.

Questions to answer in lab report:

1. Why the winner's "fruit".
2. What design did the "fruit" that traveled the furthest and lasted the longest in the air have? Why was this a particularly effective disperser? That is, what may have contributed to the extended travel or "hang time"? Was it built better, stronger, lighter? Does the weight of the fruit affect its performance?
3. Does it matter how you dropped the "fruit" in front of the fan?
4. What other factors in nature contribute to wind dispersal?
5. Does it matter if the plant is higher from the ground? In an open area?
6. What are the advantages of wind dispersal? Are there any disadvantages?
7. Is wind dispersal more likely in dry or fleshy fruits?

Credits:

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